

### **Amendments to the Claims:**

This listing of claims will replace all prior versions and listings of claims in the present Application:

#### **Listing of Claims:**

1. (Withdrawn)
2. (Currently Amended) The method of claims 17, 20, 21 or 22, additionally comprising acquiring multiple test data sets relating to one or more optical properties of the sample population at multiple, selected spatial locations in the sample population.
3. (Currently Amended) The method of claim 17, 20, 21 or 22, additionally comprising exposing the sample population to a physiological challenge prior to acquiring the test data.
4. (Currently Amended) The method of claim 17, 20, 21 or 22, additionally comprising acquiring control data relating to the one or more optical properties of the sample population prior to exposing the sample population to a candidate optical contrast enhancing agent.
5. (Previously Amended) The method of claim 4, additionally comprising comparing the test data to the control data to assess changes in the one or more optical properties of the sample population representing activity of the candidate optical contrast enhancing agent.
6. (Currently Amended) The method of ~~claim 17~~ claims 20, 21 or 22, wherein the comparison data is derived from empirically determined controls.
7. (Previously Amended) The method of claim 3, wherein the physiological challenge is selected from the group consisting of: exposure to a test agent, a test condition, a drug, a hormone, a biological agent, a toxin, an infectious agent, radiation, chemotherapy, deprivation of a metabolite or nutrient, electrical stimulation, inflammatory agent, and oncogen.
8. (Currently Amended) The method of claim ~~17~~, 17 or 22, additionally comprising maintaining multiple sample populations in an *in vitro* culture system.

9. (Currently Amended) The method of claim 17, 20, 21 or 22, wherein the test data acquired relates to one or more optical properties selected from the group consisting of: reflection, refraction, diffraction, absorption, scattering, birefringence, refractive index and Kerr effect.

10. (Canceled)

11. (Currently Amended) The method according to claim 17, or 22, wherein the biological material is a viable, intact organism.

12. (Withdrawn)

13. (Withdrawn)

14. (Withdrawn)

15. (Withdrawn)

16. (Withdrawn)

17. (Currently Amended) A method for identifying optical contrast enhancing agents useful for enhancing the sensitivity of optical detection of a biological material comprising:

maintaining at least one sample population of the biological material in one of the following systems: a cell culture system; a tissue culture system; an organ culture system; and an intact organism;

exposing the at least one sample population to a candidate optical contrast enhancing agent;

illuminating the at least one sample population with electromagnetic radiation (emr);

acquiring test data relating to one or more optical properties of the sample population subsequent to exposure to the candidate optical contrast enhancing agent;

comparing the test data acquired to comparison data relating to the one or more optical properties of the sample population, the comparison data being derived from empirically determined controls, whereby changes in the one or more optical properties reflected in the test data compared to the comparison data represent the optical contrast enhancing activity of said agent in said sample population; and

based on the comparison data, determining if the optical contrast enhancing agent is useful for distinguishing pathological cells or tissue.

18. (Withdrawn)

19. (Currently Amended) The method according to ~~claim 17~~, claims 17 or 20, wherein the biological material is an organ culture system.

20. (New) A method for identifying optical contrast enhancing agents useful for enhancing the sensitivity of optical detection of a biological material comprising:

maintaining multiple sample populations in an *in vitro* culture system;

exposing the sample populations to a candidate optical contrast enhancing agent;

illuminating the sample populations with electromagnetic radiation (emr);

acquiring test data relating to one or more optical properties of the sample populations subsequent to exposure to the candidate optical contrast enhancing agent;

comparing the test data acquired to comparison data relating to the one or more optical properties of the sample populations whereby changes in the one or more optical properties reflected in the test data compared to the comparison data represent the optical contrast enhancing activity of said agent in said sample populations and

based on the comparison data, determining if the optical contrast enhancing agent is useful for distinguishing pathological cells or tissue.

21. (New) A method for identifying optical contrast enhancing agents useful for enhancing the sensitivity of optical detection of a biological material comprising:

maintaining at least one sample population of the biological material in a viable intact organism;

exposing the at least one sample population to a candidate optical contrast enhancing agent;

illuminating the at least one sample population with electromagnetic radiation (emr);

acquiring test data relating to one or more optical properties of the sample population subsequent to exposure to the candidate optical contrast enhancing agent;

comparing the test data acquired to comparison data relating to the one or more optical properties of the sample population, whereby changes in the one or more optical properties reflected in the test data compared to the comparison data represent the optical contrast enhancing activity of said agent in said sample population; and

based on the comparison data, determining if the optical contrast enhancing agent is useful for distinguishing pathological cells or tissue.

22. (New) A method for identifying optical contrast enhancing agents useful for enhancing the sensitivity of optical detection of a biological material comprising:

maintaining at least one sample population of the biological material in one of the following systems: a cell culture system; a tissue culture system; an organ culture system; and an intact organism;

exposing the at least one sample population to a candidate optical contrast enhancing agent;

illuminating the at least one sample population with electromagnetic radiation (emr) having a wavelength of from 700-2500 nm;

acquiring test data relating to one or more optical properties of the sample population subsequent to exposure to the candidate optical contrast enhancing agent;

comparing the test data acquired to comparison data relating to the one or more optical properties of the sample population, whereby changes in the one or more optical properties reflected in the test data compared to the comparison data represent the optical contrast enhancing activity of said agent in said sample population; and

based on the comparison data, determining if the optical contrast enhancing agent is useful for distinguishing pathological cells or tissue.